

2 JAN 1958

The Vice President
The Capitol
Washington 25, D. C.

Dear Mr. Vice President:

In accordance with your request of 27 December 1957, we are submitting below information in addition to that contained in National Intelligence Estimate 11-5-57.

Since the flight of their first rocket powered aircraft in 1940, the Soviets have shown considerable interest in this type of aircraft. (See TAB A.) They not only exploited all of the German effort in this field but also had a program, ordered by Stalin himself, for the development of a rocket-propelled, skip-type intercontinental bomber, designed by the German engineer, Bruno Sänger. Just after World War II, Soviet Colonel [redacted] was sent to Germany to locate and bring Sänger to the USSR. [redacted] failed to locate Sänger and defected to the West, where he subsequently gave information on this program. Since Stalin's word was law, we must conclude that even though [redacted] defected and Sänger was not taken to the USSR the project was implemented.

With the development of the ballistic missile, it is likely that the program for developing the Sänger vehicle may have lost some of its impetus. From current Soviet scientific literature we find that they may have concluded that the skip vehicle is an effective way to return to earth from space flight. In the US we have determined that a straight glide vehicle is more effective than a skip vehicle for this purpose.

The Soviets have made numerous statements in recent months that a manned space vehicle will be feasible in the near future and is a prime objective of theirs. It appears that they recognize the winged vehicle not only as a practical method, possibly the only one now feasible, for return of a manned vehicle from outer space. While we have no firm evidence, such a program undoubtedly is being given

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high priority by the Soviets.

From the foregoing, it is concluded that the Soviets probably have had a continuous research program involving the use of rocket propelled aircraft. This program would probably produce the results that we hope to obtain with the X-15 project. We believe, but have no evidence to prove, that such research aircraft are now or soon will be flying in the USSR.

From the point of view of missile as opposed to aircraft development, we believe the USSR seriously engaged the problem of manned space conquest several years ago and at the present time is probably aggressively pursuing such a program, being now in the hardware phase of accomplishment. The spectacular successes (satellite flights) exhibited to date by the USSR show that the Soviets are building on a sound scientific base, and their projected space flight program probably has an excellent chance of success.

On 27 November 1953, Academician A. N. Nesmeyanov, President of the USSR Academy of Sciences, before the World Peace Conference in Vienna, stated "Science has reached a state when it is feasible to send a stratosphere to the Moon, to create an artificial satellite of the Earth." In the fall of 1954, the USSR established the Inter-agency Commission for Interplanetary Communications under the USSR Academy of Sciences to "coordinate and direct all work concerned with solving the problem of mastering cosmic space."

Soviet open literature has revealed that many studies and much scientific and technical thought has been devoted to the problem, both in a popular and in a serious fundamental vein. Papers have been published on space vehicles, orbits and interplanetary trajectories. Even Einstein's law of relativity has been studied as to its effect on space travel. In 1957, the Soviets revealed that they had been testing animals in high altitude (rocket) flights for several years and the dog experiment in SPUTNIK II appears to be a continuation of their research on animal behavior under space and free flight conditions.

The Soviets have demonstrated their possession of very large rocket propulsion systems, but there is some evidence that their planning and construction of test facilities may be considerably beyond that required for testing even advanced ICBMs of extreme range. The continued exploration of the USSR into interplanetary space with both unmanned and manned vehicles must be expected. Such exploration will be expensive and extremely difficult and can only be accomplished by a planned approach which would allow a stepwise solution of the technical problems involved. In the absence of firm evidence, we can speculate that such a stepwise program might be as shown in TAB B.

By relatively minor extensions of the speculated program indicated at TAB B, the USSR could also achieve parallel and simultaneous capabilities, not discussed herein for the sake of brevity, such as reconnaissance vehicles, aids to world-wide communications and immensely advanced knowledge in the fundamental science areas. Such an over-all program would vastly strengthen the Soviet military and political posture.

Respectfully yours,

SIGNED

C. P. Cabell
Lieutenant General, USAF
Acting Director

Enclosures:

TAB A
TAB B

CONCURRENCES:

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Assistant Director/Scientific Intelligence

31 Dec 1957
Date

Deputy Director/Intelligence

Date

Distribution:

2 - Addressee (by Rang, 1/2/58)
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OSI/____:gs (31 Dec. 1957)

TABLE A

Intelligence Indications of Soviet Interest in
Piloted Rocket Airplanes for
High Altitude or Space Flight

1. The date of the first Soviet rocket powered airplane is not known, but it may have been that piloted by Fedorov in February 1940, using an engine designed by engineer Bokhtin.
2. The German-designed DFS-346 was rebuilt in the USSR by German teams, two airplanes being completed prior to October 1944. It was a prone position airplane, powered by two pure rocket Walter HKK engines of 3,700 pounds thrust each, designed for experimental flight at speeds up to Mach 2, at 6,000 feet. It was to be launched by an airplane at 33,000 feet. It was fueled by "C-Stoff and T-Stoff" (Methanol and hydrazine hydrate, and hydrogen peroxide). Flights which were presumed to have been supersonic were completed in 1946.
3. The third known Soviet rocket powered airplane was the 406 delta, designed by Dr. Siegfried Günther (formerly of Heinkel) in 1950. It was powered by four rocket engines, three having 5,500 pounds thrust each and one cruising engine having 2,500 pounds thrust. Its gross weight was 23,000 pounds, design altitude 70,000 feet, and design speed Mach 1.5. A glide test vehicle for this airplane was completed in about September 1950, but shortly thereafter Soviets took the entire project from Experimental Zavod No. 1, where it was initiated.
4. What may have been the fourth Soviet rocket airplane is described in Soviet literature, but it is also possibly the Bell X-1 (flown in 1946, supersonic flight in 1947). Because it is not known for certain whether this is a Soviet or American airplane, the description is quoted as follows: "One of the airplanes with a liquid fuel . . . engine is designed for flight at supersonic speeds. The four chamber [rocket] engine of this plane operates on liquid oxygen and alcohol Feeding of fuel into the combustion chambers is . . . by turbine pump. The amount of thrust [~~is~~] regulated by varying the number of operating chambers. The plane is of all-metal construction designed for high [strength] and should withstand . . . 18 [~~G~~g]. The computed maximum speed at an altitude of 18 km. is 1,100 km/hr and at an altitude of 24 km it rises to 2,700 km/hr. That airplane represents an experimental design for

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the study of supersonic flights. To lengthen the duration of the flight at high altitude, this plane was towed on test flights by a powerful propeller-driven airplane for several kilometers after the takeoff."

5. A Soviet release in which doctors discuss interplanetary flight dwells on the problem of existence without gravity. "Experimental flights have lately been made by rockets whose passengers experienced conditions of no gravity for a period of two to three minutes." Again without definite indication of the nationality of the airplane and pilot, the release continues: "In 1951, a pilot on a special test flight found himself under conditions of no gravity for a period of 15 to 20 seconds. During this time his heart functioned normally and respiration was not interrupted. It is true that at first he could not coordinate his movements, but after a few attempts he managed to overcome the difficulty."

... In a lengthy dispatch on the launching of dogs to heights of at least 110 kilometers and recovering of the live dogs by parachute, the release concludes: "Soviet scientists work to advance the time when the flight of man into space will come to be a fairy tale and become a reality, when with the use of spaceships, people will be able to establish contact with remote and so far unknown worlds."

7. A rocket engine for airplanes, having two combustion chambers, was reported to be a joint project of an engine factory in Leningrad, and the Luipa Werk "Walter Ulbricht" in East Germany. The Luipa works did research from 13 February to last of March 1957 on fuels and materials. The two chambers of the engine were 20 and 35 cm. diameter respectively, and the maximum thrust developed was reported as 10,000 kgs., about 22,000 pounds. No further information is available.

8. In a Soviet released propaganda film "Rocket to the Moon" a manned eight-rocket airplane was shown which carried a satellite launcher "piggy back." This was a Disney-like film apparently receiving technical guidance from the scientists working on the Soviet satellite projects. The Soviet project having relation to this film is the "Moon-Venus-Mars Project," of Dr. S. Khrustsevich, aimed at putting man on the moon. Khrustsevich lectured at the Institute of Astronomy at Moscow regarding this project but did not say whether any stage of the rockets to be used involved the airplane shown by the propaganda film.

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9. In a press release of 1 December 1957 V. V. Alekseev discussed what appears to be a rocket airplane that is a cross between a standard jet fighter and a space ship. The rocket plane is said to be the "last phase in development of the airplane before transition to interplanetary ship." It is to be built in the shape of a jet plane, but with folding wings. It would be blasted off with the wings folded and continue in a ballistic trajectory. On reaching the earth's atmosphere on the return, the wings would be extended enabling the plane to slow down and glide back to its base. "The country that possesses the best intercontinental ballistic missile and the new high calory fuels will be the first to build such a rocket plane."

TAB BPossible Soviet Space Travel Timetable

<u>STEP</u>	<u>DATE</u>
a. High altitude rockets with animals	1951-1956 (accomplished)
b. Earth satellite with scientific instruments (non-recoverable)	1957 (accomplished)
c. Earth satellite with animal (non-recoverable)	1957 (accomplished)
d. Earth satellite with animal (recoverable)	1958
e. Manned rocket plane for limited exploration of space and space problems (recoverable)	1958
f. Non-manned lunar vehicle with animal and scientific instruments (non-recoverable)	1958
g. Manned Earth Satellite (recoverable)	1959
h. Non-manned lunar vehicle with animal and scientific instruments (recoverable) (Does <u>not</u> land on Moon)	1959
i. Manned lunar vehicle (recoverable) (Does <u>not</u> land on Moon)	1961
j. Manned space platform around Earth for scientific observation (Non recoverable)	1963-1964
k. Manned interplanetary travel (Does not land on planets but could land on Moon)	1970